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ABSTRACT

A computerized student record system with a testing system that allows schools to fully utilize testing data is being developed at Oakland Schools in Pontiac, Michigan. Test data are integrated with a tremendous amount of other information. Designed for flexibility, up to 1200 items can be stored within a student record for each test administration and used to generate a wide variety of reports. The system can create temporary disk files of student test results that can be manipulated by the Statistical Package for the Social Sciences (SPSS). System applications a district might use during a typical school year are described to illustrate how a comprehensive testing program can be used in a database environment. Examples include: (1) creating class lists showing student status on latest testing; (2) generating feeder school reports on ninth grade science final exam to find differences between junior high schools for the science curriculum committee; and (3) analyzing achievement test scores and generating parent profiles, administrator summaries, and subtest analyses for curriculum evaluation teams. New applications are being developed to further utilize testing information. (BS)

Testing in a Database Environment

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Achievement testing is in the limelight. Since "A Nation at Risk," one commission after another has published its opinion on how to improve schools. Nearly all of the reports have included the recommendation that schools give more tests. Tests are one of the most objective measures of the product of the educational enterprise. Without tests, teachers and administrators are like blindfolded dart throwers trying to improve their accuracy without feedback. Most schools already give enough tests. They are not, however, using tests enough.

Publishers have created textbooks, tests and computer programs that support each other. The programs keep track of students' progress through sets of instructional objectives by scoring and storing test results. The student and class level reports are usually very specific and provide teachers with nearly immediate feedback about the achievement of each student in the classroom. These systems, while providing great help to the classroom teacher, have frequently not been used to the extent possible because of their very limited capacity for aggregating across students or time.

At Oakland Schools, a testing system is being developed that allows schools to fully utilize testing data. It is, in fact, not a testing system. It is a computorized student record system which includes a testing system. To be fully utilized, test data must be integrated with a tremendous amount of other information. Which schools the student attended and will attend, and which courses the student took, and the grades he or she received are a few examples of the kinds of data that must be available to put the appropriate report into the hands of decision makers at the appropriate time.

The single greatest feature of the design of the system is its flexibility. The philosophy is, "if it moves, measure it and store it, somebody will want it later." Up to 1200 items may be permanently stored within the student record for any given test administration. What is an item? A number between 0 and 9. Up to 250 scores may also be stored for the same test administration. What is a score? A number between 0 and 999,999. The meanings of these items and scores are entirely dependent upon the situation. They may be norm or criterion referenced tests. They may be attitude surveys. They may be recommended math class codes. They may even be grades. The system creates standard reports within which individual users have complete flexibility to compose the contents of class lists, press-on labels, student profiles, and school and district summaries. It is able to group student test results by building, teacher group, test scores, sex, actual grade, current course and section, next school, previous school on a given date, and current school and year of graduation.

The system also has the capabiltiy to create temporary disk files of student test results that are directly usable by SPSS (the Statistical Package for the Social Sciences). SPSS allows users to manipulate data for research purposes by means of subroutines as simple as a frequency distribution or as complex as multivariate analysis of variance. SPSS has a report generating feature that allows massive amounts of data to be summarized on a single, user-formated page. The report feature can also be used to list student level data. SPSS is also used for reliability analysis of tests.

It is impossible to describe all of the situations in which tests can be used in schools. In order to convey a sense of how a comprehensive testing program can be used in a database environment, the author will de-

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scribe some of the applications of the system a district might use during a typical school year.

September 1	Classes start up next week. Create class lists showing status on latest NRT (norm referenced test) and CRT (criterion referenced test-usually locally developed). New course and sections and homerooms and movement between elementary, middle, and high schools have been assigned by normal FM (file maintainance).
September 15	Midwest Talent Search screening. List alpha by middle school, all 7th and 8th graders who got a PR of 95 or higher in total reading or total math on the 5th grade administration of the CAT (California Achievement Test).
October 1	MEAP testing starts next week. Preslug answer sheets with student numbers so MEAP results can be added to student data base. 4th graders alpha by homeroom, 7th alpha by middle school, 10th grade alpha by government class.
November 1	Career education unit starts next week. Preslug DAT/CPQ (Differential Aptitude Test with the Career Planning Questionnaire) for all 9th graders. This test, after it is scored and reported will provide students an objective analysis of the match between their aptitudes, educational plans, and school subject preferences, and their tentative career choices.
November 15	Science curriculum committee wants to see if a feeder school report shows any large differences between the junior highs on the 9th grade science final exam.
December 1	Mathematics Exit Competency Exams next week. Preslug answer sheet for all students who have not already mastered all 12 objectives. List on the answer sheet which objectives the student has not accomplished since he only needs to attempt those sections of the test- alpha by math class plus those who are not in any math class.
December 15	Create lists for math classes showing mastery level of all students in class whether they just took the test or not. Create achievement report in letter form to mail to parents if student had not already achieved mastery of all objectives. Parent report treats test as 12 objectives, teacher report treats same test as 23 objectives to help pinpoint appropriate intervention.

January 1 .

Create list of all 12th graders who have not mastered all 12 objectives. These students may not be able to graduate!

January 15

Program for the Gifted and Talented Coordinator wants lists of any student who earned a PR of 97 on any subtest of any test for the past 3 years.

February 1

Scheduling time at the secondary schools. Merge DAT and math competency results to use for course selection analysis. The administrator doing the actual scheduling wants the list by recommended course. Counselors want the data alpha by counselor. The Assistant Superintendent for Secondary Instruction wants a summary of recommendations by school and the characteristics of the typical student in each group. Use next school for grades 5 and 8 because they will be changing schools.

Create crosstabulation of DAT VR+NA scores and final grades for each math course on last year's students to help counselors show students the relationship that usually exists. Remind them that in all course selection problems to let student make the final decision. Guidance counselors.

Merge the CAT results and the writing competency results for placement in English and remedial reading and composition classes.

List students in grades 4, 7, and 10 who mastered less than 75% of the objectives on MEAP.

March 1

Oh, God! The Board of Education wants to know if anyone is really learning anything. The board member who is convinced that girls and boys are not being treated equally has to be addressed; so does the one who is convinced that we have the same kind of student population we had 15 years ago (back then, our average IQ was 118); so does the one who believes that new students in the district are pulling us down.
Create slides of graphs:
1. Reading, Language, Math and Aptitude PR for typical student for last 5 years in entire district. Note that changes in aptitude are probably due to changing student body.
2. Since math scores have improved the least, show item analysis of 5 math items with which 8th grade students had the most trouble.
3. Compare boys and girls on last year's CAT at grades 3, 5, and 8 (reading, math & language).
4. Compare 8th grade results for students who have been in the district more than 5 years, 3-5 years and less than 3 years.

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5. Percent of students who have mastered each
of the math competencies and the writing
competency at grades 9-12.
6. Percent of students who have mastered 75%
or more of the reading and math objectives
on MEAP at grades 4, 7, and 10 for the past
13 years.

April 1

The North Central Evaluation Team is in the
high school. They want to know the percent of
students by sex who are 3 years below grade level
in reading, 1-2 years below, at grade level, 1-2
above, and 3 years above grade level. Wonder how
many years back they would like us to go?

May 1

Time for the annual administration of the CAT/TCS
at grades 3, 6, and 8. Preslug answer sheets, as
usual.

May 15

Analyze CAT data for unbelieveable results - 50
PR point spread between Reading, Math or Language.
Alpha by district - include school name for each
student. Look again for students with 25 point
difference. List these alpha by school.
Correct errors at the individual student level without
disturbing teacher groups or buildings.

Analyze data for significant differences between
aptitude and achievement using publisher's criteria.
Include results of this analysis only on class lists.

Generate standard parent profile and administrators'
summaries.

Generate item analysis of math and science subtests
for use by curriculum evaluation and review team.

June 1

Math competency testing. Merge new objective mastery
with last cummulative summary for each student.
Create appropriate reports for administrators.
Teachers get theirs next fall.

June 20

Relief. Kids are gone for the summer. Director of
Research and Evaluation wants analysis of covariance
on the pre-post testing designed to evaluate the new
reading curriculum.

The science committee wants a reliability analysis
on the new test they piloted this spring.

Time to load all the disks from the micros that were
monitoring the Scott Foresman reading program into the
data base so rescheduling only has to be done once and
to get district summary. Up-loading will also make
it available to use with CAT and TCS for program
evaluation and placement.

> Don't forget to run the program that puts out the
> image of the student label so counselors and teachers
> have access to all the testing data available on each
> student. That's the same image that allows electronic
> testing record transfer between districts.

August 20   . When does my vacation start?

This scenario is intended to describe examples of the types of thing
that are already being done. New applications are being developed almost
weekly.

As the public has demanded more and more evidence about the effective-
ness of schools, many have reacted by agreeing to more testing. Testing
is quality control. It is not production. Teachers need all the time
they can possibly get for teaching. Testing time needs to be limited to
allow instruction to take place. When testing does occur, however, it
should be used. When testing is integrated with all the other information
available in a comprehensive database environment, it is available for
use.